

CLAIMS

1. A method for producing a plastic lens which comprises forming a hard coat film by coating a plastic substrate with a coating composition comprising:
- 5 (A) modified colloid particles of a stannic oxide-zirconium oxide composite having diameters of 4.5 to 60 nm which are formed by coating surface of nuclei with colloid particles of a tungsten oxide-stannic oxide-silicon dioxide composite having diameters of 2 to 7 nm, a ratio of amounts by weight of WO_3/SnO_2 of 0.1 to 100 and a ratio of amounts by weight of $\text{SiO}_2/\text{SnO}_2$ of 0.1 to 100 using as the nuclei colloid particles of a stannic oxide-zirconium oxide composite having diameters of 4 to 50 nm and a structure formed by bonding colloid particles of stannic oxide obtained by reaction of metallic tin, an organic acid and hydrogen peroxide and colloid particles of zirconium oxide to each other in amounts such that a ratio of amounts by weight of the oxides of $\text{ZrO}_2/\text{SnO}_2$ is 0.02 to 1.0, and
- 15 (B) an organosilicon compound.
- 20 2. A method for producing a plastic lens according to Claim 1, wherein the organic acid is oxalic acid or an organic acid comprising oxalic acid as a main component.
3. A method for producing a plastic lens according to Claim 1, wherein the modified colloid particles of a stannic oxide-zirconium oxide composite are produced in accordance with a process comprising steps (a) to (f):
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step (a): a step comprising forming colloid particles of stannic oxide having diameters of 4 to 50 nm by reacting hydrogen peroxide and metallic tin in an aqueous solution of an organic acid in a manner such that a concentration of stannic oxide is 40% by weight or smaller while a
5 ratio of amounts by mole of hydrogen peroxide to metallic tin $\text{H}_2\text{O}_2/\text{Sn}$ is kept in a range of 2 to 4;

step (b): a step comprising mixing an aqueous sol of stannic oxide which comprises colloid particles of stannic oxide having diameters of 4 to 50 nm obtained in step (a) in a concentration of 0.5 to 50% by weight as an
10 oxide SnO_2 with an aqueous solution which comprises an oxy zirconium salt in a concentration of 0.5 to 50% by weight as an oxide ZrO_2 in relative amounts such that a ratio of amounts by weight as the oxides $\text{ZrO}_2/\text{SnO}_2$ is 0.02 to 1.0;

step (c): a step comprising forming an aqueous sol of stannic
15 oxide-zirconium oxide composite having particle diameters of 4 to 50 nm by a heat treatment of a mixed fluid obtained in step (b) at 60 to 200°C for 0.1 to 50 hours;

step (d): a step comprising preparing an aqueous solution comprising a tungsten salt, a tin salt and a salt of silicic acid in relative
20 amounts such that a ratio of amounts by weight of WO_3/SnO_2 is 0.1 to 100 and a ratio of amounts by weight of $\text{SiO}_2/\text{SnO}_2$ is 0.1 to 100, and forming a sol of a tungsten oxide-stannic oxide-silicon dioxide composite by removing cations in the prepared aqueous solution;

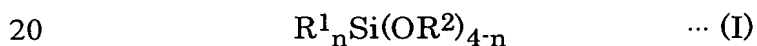
step (e): a step comprising forming a modified aqueous sol of a
25 stannic oxide-zirconium oxide composite by mixing the aqueous sol of stannic oxide-zirconium oxide composite obtained in step (c) in an amount

such that a total of amounts of ZrO_2 and SnO_2 in the aqueous sol is 100 parts by weight with the sol of a tungsten oxide-stannic oxide-silicon dioxide composite obtained in step (d) having particle diameters of 2 to 7 nm, a ratio of amounts by weight of WO_3/SnO_2 of 0.1 to 100 and a ratio of
5 amounts by weight of $\text{SiO}_2/\text{SnO}_2$ of 0.1 to 100 in an amount such that a total of amounts of WO_3 , SnO_2 and SiO_2 in the sol is 2 to 100 parts by weight at 0 to 100°C; and

step (f): a step comprising bringing the modified aqueous sol of a stannic oxide-zirconium oxide composite obtained in step (e) into contact
10 with an anion exchanger to remove anions present in the sol.

4. A method for producing a plastic lens according to Claim 3, wherein the aqueous solution of organic acid is an aqueous solution of oxalic acid or an aqueous solution of organic acids comprising oxalic acid as the main
15 component.

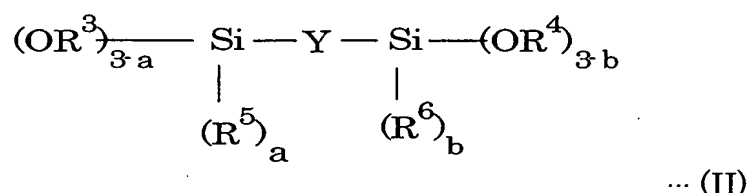
5. A method for producing a plastic lens according to any one of Claims 1 to 4, wherein the organosilicon compound of component (B) is at least one compound selected from compounds represented by general formula (I):



wherein R^1 represents a monovalent hydrocarbon group having 1 to 20 carbon atoms which has or does not have functional groups, R^2 represents an alkyl group having 1 to 8 carbon atoms, an aryl group having 6 to 10 carbon atoms, an aralkyl group having 7 to 10 carbon atoms or an acyl
25 group having 2 to 10 carbon atoms, n represents 0, 1 or 2, a plurality of groups represented by R^1 may be a same with or different from each other

when a plurality of R¹ are present, and a plurality of groups represented by OR² may be a same with or different from each other when a plurality of OR² are present;

compounds represented by general formula (II):



wherein R³ and R⁴ each represent an alkyl group having 1 to 4 carbon atoms or an acyl group having 2 to 4 carbon atoms, the groups represented by R³ and R⁴ may be a same with or different from each other, R⁵ and R⁶ each represent a monovalent hydrocarbon group having 1 to 5 carbon atoms having or not having functional groups, the groups represented by R⁵ and R⁶ may be a same with or different from each other, Y represents a divalent hydrocarbon group having 2 to 20 carbon atoms, a and b each represent 0 or 1, a plurality of groups represented by OR³ may be a same with or different from each other, and a plurality of groups represented by OR⁴ may be a same with or different from each other; and hydrolysis products thereof.

6. A method for producing a plastic lens according to any one of Claims 1 to 5, wherein the coating composition comprises the colloid particles of component (A) in an amount of 1 to 500 parts by weight as solid components per 100 parts by weight of the organosilicon compound of component (B).

7. A method for producing a plastic lens according to any one of Claims 1 to 6, wherein the coating composition comprises (C) a metal salt of acetylacetone.
- 5 8. A method for producing a plastic lens according to any one of Claims 1 to 7, which comprises a film formed by vapor deposition on the hard coat film.